DOCUMENT RESUME

ED 337 212 JC 910 448

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TITLE Report Prepared for the Intersegmental Coordinating Committee Meeting, January 17, 1991.
INSTITUTION California State Univ., Long Beach. Office of the Chancellor.
PUB DATE 16 Jan 91
NOTE 16p.
PUB TYPE Speeches/Conference Papers (150) -- Viewpoints (Opinion/Position Papers, Essays, etc.) (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Transfer Students; Community Colleges; Comparative Analysis; Higher Education; Information Needs; *Mathematical Formulas; Models; Ratios (Mathematics); State Universities; *Transfer Policy; Two Year Colleges; Validity

ABSTRACT

This report puts forth the position of the Office of the Chancellor of the California State University (CSU) regarding data needs for constructing California Community College (CCC) transfer rates, indicating that the CSU's preferred transfer rate would indicate the annual incidence of new transfers, convey efficiency across time, and, in combination with other data, describe student flow from two-year institutions to four-year institutions. Three proposed methods for measuring transfer rate are described in the report: an eventual transfer rate; a partial rate with a subjective denominator; and a partial rate with an objective denominator. In addition, seven other rates are evaluated in terms of four issues construct validity, group equivalence, time equivalence, and maturation validity. These seven methods of calculating transfer rates are termed the "traditional definition"; the Transfer Assembly model; BW Associates' "Effective Transfer Rate and "TC Project Evaluation" models; the University of Michigan model proposed by Lee and Frank; three alternatives proposed by the CCC Chancellor's Office; and the measures recommended for inclusion in the CCC accountability model using longitudinal data. The report concludes in favor of the Transfer Assembly model. (JMC)

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ED 337212

Intersegmental Coordinating Committee Meeting, January 17, 1991

California State University
Office of the Chancellor
Memorandum

By
Vivian Franco
Philip Garcia
R. Frances Horvath

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California State University **Office of the Chancellor**

Memorandum

To: Kathleen D. Nelson
CCC Chancellor's Office

Date: January 16, 1991

From: Vivian Franco
Philip Garcia
R. Frances Horvath
CSU Chancellor's Office

RE: Intersegmental Coordinating Committee Meeting, January 17, 1991

To help facilitate Thursday's meeting, here is our segmental view regarding data needs for constructing CCC transfer rates. Our preferred transfer rate would indicate the annual *incidence* of new transfers, and its measurement should be as valid and reliable as possible. Therefore, such a rate would convey *efficiency across time*; and, in combination with other data, it would describe *student flow* from 2-year institutions to 4-year institutions. (Given the many issues surrounding the transfer function, everyone may agree that more than one rate is required.)

After a lengthy review of the list of ratios already discussed by the Data Needs Task Force, the proportion representing the Cohen variation is our first preference. Its overall advantage, of course, comes from its cohort approach. The 5-year rate and its yearly increments would provide a solid means for assessing efficiency across time, and they would describe the transfer flow for at least half of all eventual transfers. But, if a tracking system for performing a cohort analysis is constructed, then we should proceed to delineate the entire time to transfer process, rather than arbitrarily stopping at 5 years. Thus an eventual transfer rate becomes the long term statistical objective.

We assume that cohort tracking would be accomplished by matching social security numbers. Though by no means flawless, we believe this procedure can yield very reliable data. We also realize that some non-random slippage will occur, namely CCC students who transfer to institutions other than the CSU and UC. And finally, we understand that restricting cohorts to those who state transfer objectives or earn 6-12 units during their initial year may require all concerned to expand their current enrollment reporting

systems. All things considered, we believe an intersegmental tracking system should be a consensus goal among the CCC, CSU, and UC.

Until the entire time to transfer process is documented by cohort tracking, those who wish to monitor and project student flow will have to rely on cross-sectional indicators that can be inexpensively generated on an annual basis. Among the cross-sectional rates reviewed here, the method outlined by BW Associates for the Transfer Center Project Evaluation shows the most promise. Its greater relative strength is the use of three-year averages. Its overall level of validity would be higher if the denominator observations were lagged by one year. But even so, too many denominator problems are still present, so we can't recommend widespread usage of this ratio.

We believe, however, some form of this crude ratio could legitimately monitor changes in student flow, but a new denominator must be derived from empirical analysis. We need to contrast and evaluate trend data on such annual CCC enrollments as:

- credit and non-credit enrollments for new first-time freshmen
- credit and non-credit enrollments for new entrants:
- credit and non-credit enrollments for continuing students
- number of new students who state they intend to transfer (or who view transfer as important) by number of transferable units earned (six or twelve) within a specified time period
- number of non-credit students at entry who later earn transferable units (six or twelve) within a specified time period.
- number of new entrants with baccalaureate degrees
- number of new entrants concurrently enrolled at 4-year colleges

Attachment

California State University
Office of the Chancellor
Division of Analytic Studies

January 17, 1991

Transfer Rates: Some Contrasts

Before describing the merits of any particular research design, it is customary to review the components of a true experimental design. With such a review as a backdrop, it is usually clearer to all just how a selected design deviates from the ideal method of acquiring adequate and proper data for statistical analyses. We believe this logic also applies to the discussion of transfer rates. So before comparing the merits of alternative transfer rates, it would be useful to evaluate each rate against a common referent. This is our intent.

For the CSU, the common referent should indicate the annual *incidence* of new transfers, and its measurement should be valid and reliable. Therefore, our ideal transfer rate would convey *efficiency across time*; and, in combination with other data, it would describe *student flow* from 2-year institutions to 4-year institutions. For discussion purposes, we shall review three rates which could serve as shared points of departure. (Given the many issues surrounding the transfer function, everyone may agree that more than one rate is required.)

The three rates have two important structural communalities: denominators represent groups of *new* entrants, and numerators are determined by individually tracking these new entrants over time. In short, all three rates describe the proportion of a pre-identified cohort who transfer within a specified time period. Therefore, all three represent incidence rates that can be used to project student flow in future years.

A. Transfer Rates for Pre-Identified Cohorts

The first rate we examine is the most global.

1. Eventual Transfer Rate

$$\frac{\text{Sum of Transfers from } t \text{ Entrants at Years } t+1 \ldots t+n}{\text{First-Time Entrants at Year } t}$$

Here, *first-time entrants* refer to students who are new enrollees to community colleges at year *t*, they are not continuing students. The

numerator represents the summation of all annual outputs of transfers from the cohort who entered at year *t*, with *n* noting the last observed year after *t*. CSU data suggest that about 50 percent of all CCC transfers to the CSU take 5 years or less to make the move, another 25 percent may take between 6 and 9 years, and the final 25 percent may take between 10 and 16 years. The analysis compared high school graduation and CSU matriculation dates for new transfers for 1985 through 1989, so the oldest transfer may have taken less than 16 years. Therefore, if new CCC student cohorts were tracked for 10 to 15 years, transfer rates from such data would be comprehensive.

We know the question at hand: If we adopt the cohort method, do we have to wait 15 years or more to receive meaningful outcome data? The answer is definitive: No! After a tracking mechanism is operationalized, transfer rates for any time frame can be generated by simply altering the numerator of the above ratio. For example, one-year rates would use transfers from just *t + 1*, two-year rates would sum numbers from *t + 1* and *t + 2*, three-year rates would sum numbers from *t + 1, t + 2, and t + 3*, and so on. So an eventual transfer rate based on 10 to 15 years of data collection could be the final outcome in the incremental analysis of time to transfer.

What are this ratio's advantages in terms of validity? We believe there are at least four. First, because the numerator sums events across the entire "life span" of CCC students, the cohort rate accurately reflects the theoretical concept it is supposed to measure: the proportion of transfers that emerge from a cohort of new community college students within a specified time period. Let's call this virtue *construct validity*.

Second, the ratio's numerator and denominator are each based on the same pool of students--new entrants--so this ratio would not yield a biased value which was either systematically higher or lower than the true value. For instance, if the denominator was based on a larger pool than the numerator, then the rate would be artificially low; conversely, if the numerator was based on a larger pool than the denominator, then the rate would be artificially high (this latter example is the more likely case). Let's call this virtue *group equivalence*.

A third advantage is related to the fact that the numerator and denominator both have the same *t*-year origin. Because this is true, there is never a doubt that the ratio's numerator and denominator may be differentially affected by the growth or decline in the annual number of new entrants. For some transfer rates, periods of high growth would depress true values and

periods of rapid decline would inflate true values. Let's call this virtue *time equivalence*.

The fourth advantage is related to the fact the numerator sums multiple years of observed transfers. Longitudinal tracking of a pre-identified cohort on an annual basis removes any fears that a transfer rate's observation period did not allow enough time for students to naturally mature from new entrants to successful transfers. Let's call this final virtue *maturation validity*.

Before leaving this ratio, let me briefly comment on another important set of variations that could improve the validity of the above ratio. First-time entrants could be partitioned into at least two meaningful subgroups: 1) first-time freshmen (i.e., high school graduates with no prior college experience, and 2) lower-division college students (i.e., students with prior college experience). Separate rates for first-time freshmen would inform us on how high school students use community colleges as direct vehicles to becoming upper division students at baccalaureate conferring institutions. Moreover, separate rates for lower-division college students could inform us about inter-campus mobility among community colleges, and the extent to which community colleges act as a safety net or way station for CSU and UC. In all, these separate sets of rates would numerically capture, in part, the multifaceted nature of the transfer function; and they would further strengthen the issue of maturation validity. (I'm not going to revisit this topic much; however, keep in mind that it is relevant to all the rates examined herein.)

The next two ratios address the fact that the mission of community colleges goes beyond the transfer function.

2. Partial Rate--Subjective Denominator

$$\frac{\text{Sum of Transfers from } t \text{ Entrants at Years } t+1 \ldots t+n}{\text{First-Time Entrants at Year } t \text{ w/Transfer Objective}}$$

Now the denominator is composed of individuals who state at entry that their academic objective is to transfer. In general, values from this ratio would be higher than comparable values from the first ratio, since all students would not self-identify, via survey methods, as potential transfers. The merit of this ratio is that it may be a more stable representation of student flow than the global ratio cited above. It also may be a better measure of accountability.

Subjective response to a survey question, unfortunately, raises the specter of measurement error. How many students properly identify themselves as potential transfers? Is the error random? If a preponderance of students perceive an *intent to transfer* as the most socially acceptable response, then the denominator will be overstated. If, on the other hand, a preponderance of students acquire an *intent to transfer* after entry, then the numerator will be understated. Or it is possible that these two sources of error wash each other out. But since the extent of each source of error is unknown, this ratio would not possess absolute construct validity at its first usage. It would, however, possess the other three virtues. The statistical remedy would be to calculate this ratio along with the global ratio and analyze differences.

3. Partial Rate--Objective Denominator

$$\frac{\text{Sum of Transfers from } t \text{ Entrants at Years } t+1 \ldots t+n}{\text{First-Time Entrants at Year } t \text{ with } x \text{ or more units}}$$

The third cohort ratio is a variant of the second. The difference is that *intent to transfer* is now inferred from a behavioral response: earning *x* number of units within a specified time period. The possible variations are numerous. The time frame could be one or two semesters, the number of units could be six or twelve, and the units could be transferable units or all units earned. On balance, values from this ratio would be more reliable (i.e., in a test-retest sense) than values from the second ratio. There would still be some question about construct validity, so values from this ratio and the global ratio should be compared.

B. Alternative Transfer Rates

The following rates were suggested by ICC correspondence and are evaluated in terms of our four issues of validity: a) construct validity, b) group equivalence, c) time equivalence, and d) maturation validity. Validity is judged on a 3-point scale, ranging from low (1), moderate (2), to high (3).

1. "Traditional Definition"

$$\frac{\text{Transfers in Year } t}{\text{Total Credit Enrollment Year } t}$$

Construct validity: *moderate validity*, the measure, as it should be, is an annual output divided by an annual population size, but the time frame for the numerator and denominator should not be equal. The numerator should be set at *t + 1*.

Group equivalence: *moderate validity*, the numerator stems from students who may have entered the CCC as credit or non-credit enrollments, but the denominator is restricted to credit enrollments.

Time equivalence: *low validity*, both the numerator and the denominator represent unspecified years for student entry dates.

Maturation validity: *low validity*, the denominator includes all new students, who are the least likely transfers for a given year.

2. **Transfer Assembly (Art Cohen)**

$$\frac{\text{Sum of Transfers in Years } t+1,\ t+2,\ t+3,\ t+4}{\text{New Entrants in Year } t}$$

"(The n)umerator includes only those students who subsequently enrolled at a four-year institution. (The d)enominator includes only those without previous college experience, who earned 12 or more units." We assume this is a cohort measure.

Construct validity: *high validity*, but since the denominator is restricted by units earned for some time period, there may be some undercount of actual transfers.

Group equivalence: *high validity*.

Time equivalence: *high validity*.

Maturation validity: low to moderate validity, a sizable portion of transfers will surely go undetected.

3. **BW Associates (Effective Transfer Rate)**

$$\frac{\text{Transfers in Year } t}{\text{Leavers in Year } t}$$

Leavers are students who are not enrolled in a CC at year *t*, but were enrolled at *t - 1*. "The (d)enominator excludes students with BA/BS, or who are on leave from or concurrently attending a 4-year university. Students must also have accumulated 6 or more units."

Construct validity: *low validity*, this is not an incidence rate, the denominator does not represent a pool from which transfers emerge.

Group equivalence: *moderate validity*, the denominator is restricted by units earned, the numerator is not.

Time equivalence: *moderate validity*, both the numerator and denominator represent unspecified entry dates.

Maturation validity: *low validity*, since most students who leave in their first year without transferring, the denominator represents a much younger group.

4. BW Associates (TC Project Evaluation)

$$\frac{\text{Average Number of Transfers in Years } t,\ t+1,\ t+2}{\text{Average Total Credit Enrollment in Years } t,\ t+1,\ t+2}$$

Construct validity: *moderate validity*, the numerator should probably begin with *t + 1* observations.

Group equivalence: *moderate validity*, the numerator stems from students who may have entered CCC as credit or non-credit enrollments, but the denominator is restricted to credit enrollments,

Time equivalence: *low to moderate*, both the numerator and the denominator represent three-year averages for unspecified entry dates.

Maturation validity: *moderate to high validity*, despite averages, the numerator may still reflect more students with older entry dates.

5. University of Michigan (Lee and Frank, 1990)

$$\frac{\text{Number of Transfers in Years } t+1,\ t+2,\ t+3,\ t+4}{\text{HS Graduates in Year } t \text{ Enrolling at CC}}$$

We assume this is a cohort rate.

Construct validity: *low to moderate validity*, the proportion only represents the first-time freshmen experience.

Group equivalence: *high validity*

Time equivalence: *high validity.*

Maturation validity: *low to moderate validity*, a sizable portion of transfers will go undetected.

6. CCC Chancellor's Office (C. McIntyre)

(The following three proportions are in ascending order of preference), "of course, (a) and (b) are better if measured with longitudinal data than with cross-sectional data. Alternative (c) includes the most occupational students and ignores those part-time students who intend to transfer." Ratios (a) and (b) are assessed for each type of data, first for cross-sectional then for longitudinal.

a. Transfer Objective

$$\frac{\text{Transfers in Year } t}{\text{First-Time Entrants w/Transfer Objective in Year } t - 3}$$

With cross-sectional data:

Construct validity: *moderate validity*, the denominator is lagged without validation.

Group equivalence: *moderate validity*, the denominator is restricted to a self-identified group, the numerator is not.

Time equivalence: *low to moderate validity*, the numerator stems from all possible entry dates, the denominator does not.

Maturation validity: *low to moderate validity*, the denominator is too young in relation to the numerator.

With longitudinal data:

Construct validity: *moderate validity*, will not reflect transfers who at entry did not state transfer objectives.

Group equivalence: *high validity.*

Time equivalence: *high validity.*

Maturation validity: *low validity*, if summed (*t + 1* through *t + 3*), the proportion is equal to a three-year rate.

b. High School Graduates

$$\frac{\text{Number of Transfers in Years } t}{\text{HS Graduates Enrolling at CC in Year } t - 3}$$

With cross-sectional data:

Construct validity: *low to moderate validity*, the denominator is lagged without empirical validation.

Group equivalence: *low to moderate validity*, the denominator is restricted to first-time freshmen, the numerator is not.

Time equivalence: *low to moderate validity*, numerator stems from all possible entry dates, the denominator does not.

Maturation validity: *low to moderate validity*, the denominator is too young in relation to the numerator.

With longitudinal data:

Construct validity: *low to moderate validity*, the proportion only represents the first-time freshmen experience,

Group equivalence: *high validity.*

Time equivalence: *high validity.*

Maturation validity: *low to moderate validity*, if summed, the proportion is equal to a three-year rate.

c. Full-Time

$$\frac{\text{Transfers in Year } t}{\text{Full-Time Enrollment in CC in Year } t - 2}$$

This is based on cross-sectional data.

Construct validity: *low to moderate validity*, the denominator is lagged without empirical validation.

Group equivalence: *low to moderate validity*, the denominator is restricted to full-time students, the numerator is not.

Time equivalence: *low to moderate validity*, numerator stems from all possible years, the numerator is not.

Maturation validity: *low to moderate*, the denominator is too young in relation to the numerator.

7. Measures Recommended for Inclusion in CCC Accountability Model: Longitudinal Data

a. Modified Transfer Assembly Rate (Cohen)

$$\frac{\text{Transfers in Years } t+1,\ t+2,\ t+3,\ t+4,\ t+5}{\text{Students Entering in Year } t}$$

"(This is a) variation of the Cohen model. The denominator here includes only those students who have no previous 4-year college experience, and have completed at least 12 transferable units during (*t + 1* through *t +5*)."

Construct validity: *high validity.*

Group equivalence: *high validity.*

Time equivalence: *high validity.*

Maturation validity: *moderate validity*, a sizable portion of transfers may still go undetected.

b. Modified Effective Transfer Rate (BW Associates): Cross-Sectional Data

$$\frac{\text{Transfers in Year } t}{\text{Leavers in Year } t}$$

"A variation of the BW model, where the denominator includes only 'leavers' who have completed at least 12 transferable units, and have no previous 4-year experience."

Construct validity: *low validity*, this is not an incidence rate, the denominator does not represent the pool from which transfers emerge.

Group equivalence: low to *moderate validity*, the denominator is restricted by units earned, the numerator is not; and the denominator represents the first-freshmen experience, the numerator does not.

Time equivalence: *moderate validity*, both the numerator and denominator represent unspecified entry dates.

Maturation validity: *low to moderate validity*, the numerator probably reflects more students with older entry dates.

C. Summary

If you tally the scores for each alternative rate (from a possible low of 4 to a possible high of 12; see appendix), the proportion representing the Cohen variation ranks above all other measures. Its overall advantage, of course, comes from its cohort approach. The 5-year rate and its yearly increments would provide a solid means for assessing efficiency across time, and they would describe the transfer flow for a least half of all eventual transfers. But, as we have already stated, if a tracking system for performing a cohort analysis is constructed, then one should proceed to delineate the entire time to transfer process.

We assume that cohort tracking would be accomplished by matching social security numbers. Though by no means flawless, we believe this procedure can be very reliable. We also realize that some non-random slippage will occur, namely CCC students who transfer to institutions other than the CSU and UC. And finally, we understand that restricting cohorts to those who state transfer objectives or earn 6-12 units during their initial year may require all concerned to expand their current enrollment reporting systems.

All things considered, we believe an intersegmental tracking system should be a consensus goal among the CCC, CSU, and UC.

Until the entire time to transfer process is documented by cohort tracking, those who wish to monitor and project student flow will have to rely on cross-sectional indicators that can be inexpensively generated on an annual basis. Among the cross-sectional rates reviewed here, the method outlined by BW Associates for the Transfer Center Project Evaluation probably comes the closest to filling the bill. Its greater relative strength is the use of three-year averages. And, as mentioned, its overall level of validity would be even higher if the denominator observations were lagged by one year. But even so, too many denominator problems are still present, so we can't recommend widespread usage of this ratio.

We believe, however, some form of this crude ratio could legitimately monitor changes in student flow, but a new denominator must be derived from empirical analysis. We need to contrast and evaluate trend data on such annual CCC enrollments as:

- credit and non-credit enrollments for new first-time freshmen
- credit and non-credit enrollments for new entrants:
- credit and non-credit enrollments for continuing students
- number of new students who state they intend to transfer (or who view transfer as important) by number of transferable units earned (six or twelve) within a specified time period
- number of non-credit students at entry who later earn transferable units (six or twelve) within a specified time period.
- number of new entrants with baccalaureate degrees
- number of new entrants concurrently enrolled at 4-year colleges

Yes, there are yet more statistical issues to investigate and debate. And there are still the substantive issues of separate rates by age, gender and ethnicity. These latter issues, however, are secondary. After basic rates have been established, disaggregating students by other statuses reduces the problems to common classifications and programming.

Philip Garcia, Ph.D.
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APPENDIX

Validity Assessments for Alternative Transfer Rates

Rate	Validity Types: Construct	Group	Time	Maturation	Score
1. Traditional Transfer	moderate	moderate	low	low	6.0
2. Transfer Assembly	high	high	high	low to moderate	10.5
3. BW (Effective Transfer)	low	low	moderate	low	5.0
4. BW (3-Year Average)	moderate	moderate	low to moderate	low to moderate	7.0
5. Lee and Frank	low to moderate	high	high	moderate	9.5
6a. Transfer Objective*	moderate	moderate	low to moderate	low to moderate	7.0
*6a. Transfer Objective***	*moderate*	*high*	*high*	*low to moderate*	*9.5*
6b. High School Graduates*	low to moderate	low to moderate	low to moderate	low to moderate	6.0
*6b. High School Graduates***	*low to moderate*	*high*	*high*	*low to moderate*	*7.0*
6c. Full-Time	low to moderate	low moderate	low to moderate	low to moderate	6.0
7a. Modified Assembly	high	high	high	moderate	11.0
7b. Modified Effective Transfer	low	low to moderate	moderate	low to moderate	6.5

* CCC suggested rates with cross-sectional data
** *CCC suggested rates with longitudinal data.*

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